

METHOD AND SYSTEM FOR UNEVEN DISTRIBUTION OF DATA

TECHNICAL FIELD

The present invention relates to a method to transmit
5 streamed prioritized information via a secure medium, for
instance MMS, in a wireless tele- and data communication
network, whereas the subsequent differential data are
transmitted over a standard channel.

10 PRIOR ART

Most types of media often can be divided into high and low
prioritized data. High prioritized data can be compared to
a frame which has to exist to keep up details (low
prioritized data). For instance a video sequence consists
15 of two types of frames; I-frame (Intra-frame) and P-frame
(Predicted frame). An I-frame includes all information to
show a complete picture, whereas a P-frame only includes
changes from previous picture. With this technology it will
not be necessary to transmit I-frames continually to
20 achieve moving pictures, but it will be sufficient that
perhaps each 10:th frame is of I-type, the frames in
between can be of P-type. A pattern similar to IPPP...IPPP
should be possible to achieve.

25 But if now an I-frame disappears, or is destroyed, this
error will go on in subsequent P-frames, the error will
propagate until next I-frame is decoded because P-frames
are depending on that I-frames are correct, see Figure 1.

30 I-frames are high prioritized data (or the frame), whereas
P-frames are low prioritized data. It consequently is very
important that the high prioritized information is
distributed faultless to the client since an error in this
is reflected in the low prioritized information.

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The protocol which today is used at streaming (RTSP/RTP) is UDP/IP (Universal Datagram Packet/Internet Protocol) as carrier. UDP, however, neither can guarantee that a packet arrives to the receiver, nor can it prioritize different
5 types of data, but all packets are handled in the same way, irrespective of content. The above mentioned problem the user tries to tackle by means of buffering data before streaming which gives the system some seconds to request re-transmission of important data if it should disappear
10 during the transmission. The only method one has in this solution to improve the guarantee that the information will arrive correctly consequently is to extend the buffers which results in longer periods of waiting for the user.

15 US 2002/054638 shows a procedure to separate transcoded data from differential ones in an MPEG-signal. These then are transmitted over different channels. The stated reason is to keep down the size of the buffer in the receiver. Differential data can be transmitted after the transcoded
20 ones.

US 6041068 shows a procedure to distinguish I-frames from an MPEG-signal and transmit these as an appetizer to tempt
25 to purchase of the whole signal.

US 2002/073205 shows a procedure according to which MMS is used to inform a user that a streaming media content is waiting to be loaded via another channel.

30 SUMMARY OF THE INVENTION

The present invention relates to a method to, at a wireless tele- and data communication network, make it possible to transmit streamed prioritized information via a secure medium, for instance MMS, whereas differential data are
35 transmitted over a standard channel. This consequently

means that data are divided into high and low prioritized data.

The present invention is a combination of MMS and
5 Streaming. By using MMS as an initial notification for the medium, it will be possible to transmit messages with any amount of high prioritized information. For instance any number of I-frames. The video client by that has a lead at video decoding and the streaming protocol will have more
10 time to guarantee that the rest of the information will get through.

The difference of the method compared with existing systems is the utilization of MMS (or an initially secure
15 distribution of information) to create a streaming solution which increases the security that high prioritized information shall be accessible on right occasion without need for higher available bandwidth. This is done by means of the displaced distribution of the high prioritized data.

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BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in more details in the following with references to enclosed drawings, in which
Figure 1 shows propagation of errors at faulty I-frame,
25 Figure 2 shows short video sequence where all I-frames are transmitted via MMS, and other data (P-frames) are streamed,
Figure 3 shows long video sequence where all I-frames are transmitted via MMS asymmetrically, and other data (P-
30 frames) are streamed,
Figure 4 shows comprehensive representation/picture of the system for storing of streaming data,
Figure 5 shows a terminal, and
Figure 6 shows a procedure for storing of streamed
35 services.

DESCRIPTION OF PREFERRED EMBODIMENTS

The invention is a combination of two technologies, MMS and Streaming, to guarantee that the video client in the mobile terminal has access to high prioritized data on right
5 occasion. By using MMS as an initial notification for the medium, it will be possible to transmit such a message with just any amount of high prioritized information, for instance any number of I-frames. The video client in this way has a lead at the video decoding, and the streaming
10 protocol will have more time to guarantee that the rest of data actually will get through.

In the following text, the example above with different frames will be used to simplify the explanation.

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The invention can be utilized in different ways:

One alternative is when the video sequence is short; then all high prioritized information (I-frames in the example) is transmitted in the MMS message. The streaming part only
20 need to concentrate on streaming the low prioritized information (P-frames in the example), see Figure 2.

A second alternative is when the video sequence is long; then an asymmetrical transport/transmission of information
25 is created. This is done by the high prioritized information being displaced in time. If problems occur with the transmission of I-frames, or if high prioritized data become faulty, the application/system will have more time to correct this, see Figure 3. To the left in Figure 3,
30 normal flow of the information in a system. To the right in Figure 3, notice the displaced high prioritized information, I-frame, displaced in the streamed data.

Another example is if the system now, for instance, decodes
35 frame p_4^2 , and frame I_{n+2} should be faulty transmitted, then

the system will have $\sim n$ times longer time to try to transmit I_{n+2} compared with ordinary streaming.

The method can in principle be used in all video
5 applications where the system uses any kind of notification (for instance e-mail).

But of particular interest is in mobile connections (GPRS/UMTS) where there is a very limited bandwidth and
10 where one wants to do the streaming over a Best-Effort channel. In connection with that UMTS will enter into the market, there also will be more new types of services realized, such as video. It may be expensive to run all video over UMTS by means of QoS, which moreover is not
15 available in GPRS. There will be more services which have to be executed/run over the cheaper Best-Effort-channels.

In the first alternative above, where the sequence is rather short, this method might be possible to use at a
20 short video trailer to some persons. These then can at first see a "still-slideshow" of the sequence. In case the user then instead wants to see the whole sequence, the system only needs to stream over the lacking P-frames; in that way the quality of the sequence is increased at the
25 same time as the bandwidth is reduced.

The solution also would be possible to use in other systems where separation of high and low prioritized information is done. For example at building of a security solution where
30 some part of the information is transmitted via MMS (for which the system can charge, and identify the user) which is necessary to make it possible to use the rest of the information.

35 One way of transmitting high prioritized data is shown in Figure 4. Figure 4 shows a system 100 for storing of

streaming data which consists of a wireless tele- and data communication network 102 and a user 104 with a terminal 106. In the network is that part where a wanted service A is, which consists of a streaming server 108 and an MMS-server 110.

In Figure 5 the terminal 106, which uses the service A, is shown. The terminal includes i.a. an MMS-client 202, a streaming client 204, a streaming buffer 206 and a presentation/display unit 208.

In Figure 6 a procedure 300 for storing of services is shown.

According to the present invention, the procedure includes the following steps: Step 1, 302, of the procedure amounts to that a user 104 receives an MMS notification with an arbitrary greeting message and an appendix in which the initial streaming buffer "MMS PreBuf" and a streaming pointer are. The streaming pointer is an ordinary rtsp-link and an example of this is: "rtsp://server.com./file.mp4".

In step 2, 304, the user 106 decides to start the streaming session; the service is in this way activated in the MMS client 202 by user 104 requesting open the appendix of the MMS, at which the streaming client 204 is automatically started. The MMS client 202 then transmits/transfers "MMS PreBuf" (buffer data and streaming link) to the streaming client 204.

In step 3, 306, the streaming client 204 places/puts the enclosed information "MMS PreBuf" in its streaming buffer 206.

In step 4, 308, the user 106 then initiates a session with the streaming server 108 "RTSP GET" which starts streaming back the rest of the information.

- 5 In step 5, 310, the information "RTP data" will reach the streaming client 204 from the streaming server 108.

In step 6, 312, "RTP data" is placed/put in the streaming buffer 206.

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- At point A: The data which are enclosed in the MMS can be of just any kind. In the case with media (video/audio) it can, for instance, be the first seconds of the sequence. The streaming buffer 206 should in this case correspond to
15 about 15 s streaming. In case that a bit rate of 64 kbit/s is used, it will correspond to an amount of data of 120 kB.

- At point B: When the streaming user transmits the initial buffer data to the streaming buffer, this will "believe"
20 that it is only ordinary data, and has no knowledge of that these have been streamed or been loaded from the memory. In the same way the streamed information just can be added to the streaming buffer without any problems occurring.

- 25 At point C: When the streaming client 204 shall start streaming the rest of the information, there is support in RTSP to jump forward in an amount of data. In this way it will be easy to start streaming data from the point of time which is identical with the length of the buffer. For
30 instance, if the buffer is 15 s, then the streaming server 110 will have a message to start streaming data from point of time 15 s, instead of from the beginning.

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